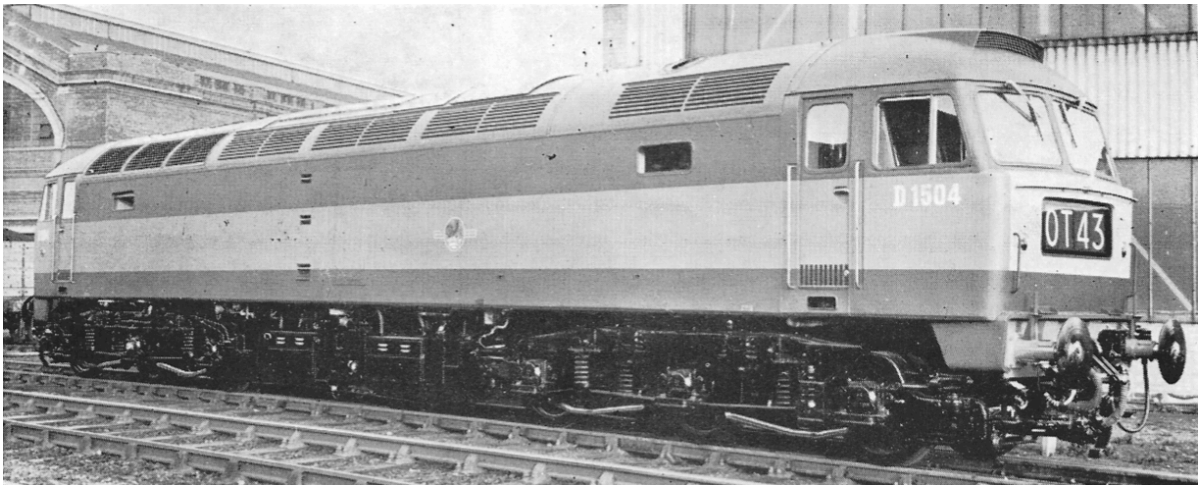
"CLASS 47 – ALMOST 60"

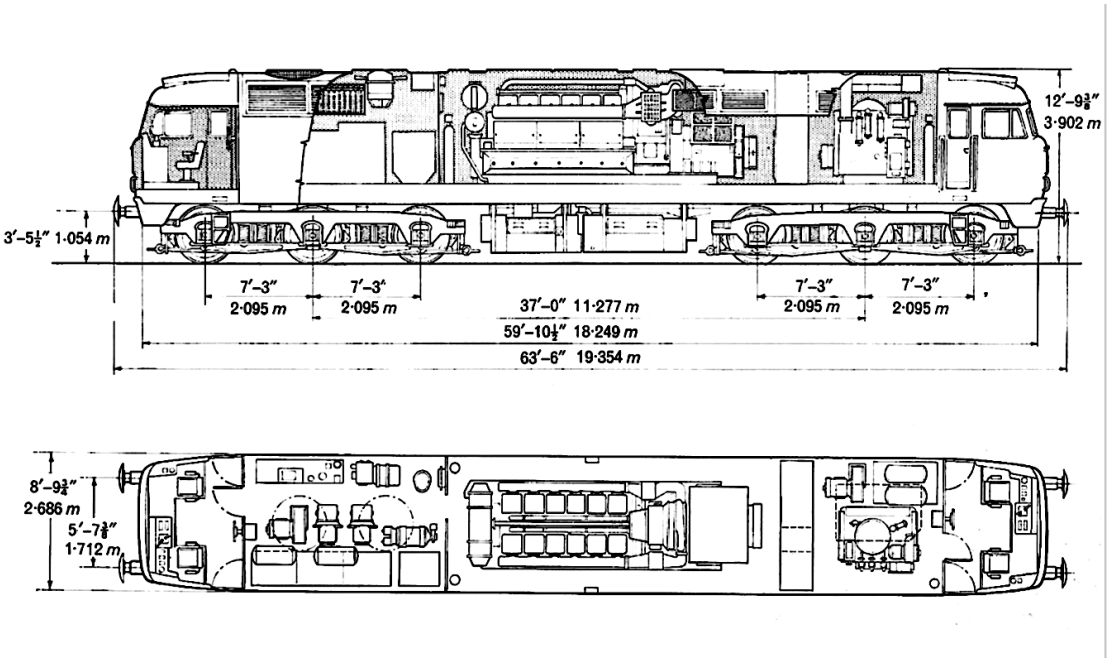
RODGER P. BRADLEY



Classic shot of one of the first of the many – D1504 resplendent in the new two-tone green livery. The lighter green was described as "Sherwood Green, and – perhaps arguably, this was the best livery for these 2nd generation diesels on BR during the 1960s.

The most widely used, most well known, longest surviving, successful - just some of the words you might use to describe the Brush Traction design ordered by British Railways in the early 1960s. Successful was not at one time a word you would have used to describe this locomotive – a bulk order, rushed through as BR's debts were climbing, and the 'Pilot Scheme' diesels were still "on trial". Brush too, was perhaps an unlikely choice as supplier, since the company did not have the same pedigree as English Electric, AEI, Birmingham RC&W Co., or Metropolitan-Vickers in the railway field. But, as Dylan said, the times they were "a-changin".

Why the Class 47, and why this particular design and arrangement? Especially in such large numbers. The answer to a degree lies with the earlier 'Pilot Scheme' designs, with a design philosophy that can best be described as 'steam era', with big, and very heavy steel fabrications, carried on very complex bogies. Weight and horsepower per ton were not good, and only 5 years separated the 2,000hp designs from English Electric and BR themselves, and the highly successful Brush/Hawker Siddeley Type 4. With a new 2,750hp Sulzer diesel, it weighed a mere 114 tons, and with a top speed of 95mph could haul high-speed passenger as well as fast freight services.



In my early days as a train spotter - and I'm sure many readers would say the same - the word diesel was not mentioned in railway

circles, unless associated with some disparaging remark. And, no one would have wanted to run or construct a model of one of these obnoxious boxes on wheels, would they?? Ah well, a goodly number of years, and models have come and gone since then, and over half a century later, the Brush Type 4, or Class47 has probably come to deserve the term "classic", and equally deserving of a place in the diesel locomotive's hall of fame.

Brush Type 4 No.D1910 (later No.47 233) in BR two tone green loading coal from a hopper at the then new Blaenant Colliery with 30 new 26ton HOP AB hoppers (without the canopies which later increased their capacity to 32 tons) for Aberthaw Power Station, c.08/66.

Photo: Hugh Llewelyn - D1910Uploaded by Oxyman, CC BY-SA 2.0, https://commons.wikimedia.org/w/index.php?curid=24383420

The original design from Brush Electrical Machines saw its earliest deliveries take place in December 1962, and the locomotives were produced in such numbers that within a couple of years, they had become almost the most numerous class on British Railways. They were adopted as the standard design in the type 4 power range and have been the most successful of all B.R.'s first and second generation diesel types, though they were not without their trials and tribulations. In addition to a number of setbacks and operating problems – some more serious than others - numerous experiments, developments and modifications have made useof these locomotives as guinea pigs.

Over 500 of the type were eventually constructed for British Railways, and yet, with the exception of ten 2,500hp Co-Co units for Cuba (ordered from the Clayton Equipment Co. in 1963), the Brush-Sulzer design did not result in major export orders. When the order for 100 of the class 60 locomotives was placed in 1988 for B.R.'s Railfreight Sector, many of the class 47s were expected to disappear from service. In fact, plans to replace the 47 took shape around three years earlier, as British rail announced its main line locomotive renewal programme. During the 1970s and 80s numerous sub divisions of class 47 appeared, resulting in many modifications, and some acting as test beds for new diesel engines for the yet to arrive Class56 and Class 58 classes. This was followed by a degree of reclassification reminiscent of similar work carried out by the LNER, and its steam locomotives in the 1930s and 1940s.

The class 47 was not the first main line diesel from the Brush stable to operate on British Railways, since the 1250hp (it was then!) type 2, or class 31 was devised by the Loughborough team, and introduced in 1957. Four years later, the British Transport Commission ordered an initial batch of 20 type 4 locomotives from Hawker Siddeley in February 1961.

The similarity in appearance with the "Falcon" prototype is clearly seen in this publicity shot. © *RPB Collection*

This pilot order resulted from a decision not to build more of the ungainly 2000hp 1Co-Co1's at Derby. These locomotives, both the English Electric, and 'Peak' versions were unsuitable for use in, amongst other things, 'hump' marshalling yards, and this was one area where the Brush Co-Co design proved successful. Before this however, AEI, and the Birmingham Railway Carriage & Wagon Co. produced the "Lion" prototype, with its Sulzer engine, and rated at 2,750hp, and the company were invited to co-operate in building a large fleet of type 4s for British Railways. The negotiations however were not successful, and Brush were contacted, with a view to producing a 2,750hp type - the result of this was of course the pilot order for 20 locomotives. The original plan to produce 203 of the large 2,000hp 1Co-Co1 diesels from Derby was reduced to 193, as 10 of the final batch were cancelled in favour of the new Brush design.

The tender process and design work resulted from the target British Railways had been set by the Government to eliminated steam traction by 1968, which in turn led to a requirement for a new Type 4 locomotive. One of the main criteria was for a loco with a maximum axle load of 19 tons, and in large numbers. All of the main companies, including the ill-fated North British Locomotive Co. were bidding for the work. Three of the four companies offered a Sulzer engine design, whilst English Electric of course offered its own diesel, in a layout that eventually became DP2.

AEI, as mentioned, were partnering with the Birmingham RC&W Co., offering a Sulzer powered production version of the "Lion" prototype (D0260). This was the preferred offering for BR, but at the same time the Brush twin-engine prototype "Falcon" (D0280) was being built, and the company offered 3 different versions, with both single and twin Sulzer engines, or an English Electric diesel. The Brush "Falcon" twin-engined prototype was fitted with Maybach MD655 diesels, which were already in use on the Western Region.

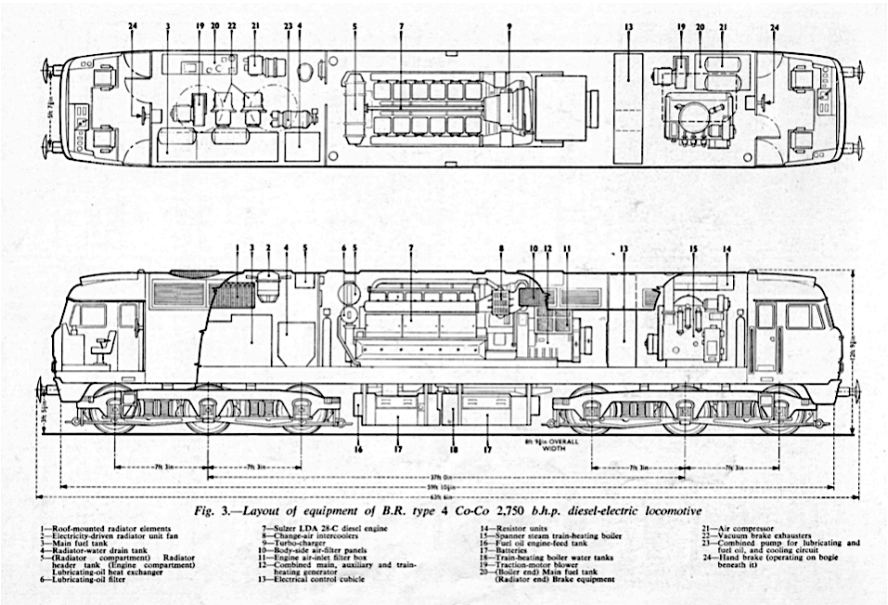


Fig. 3.—Layout of equipment of B.R. type 4 Co-Co 2,750 b.h.p. diesel-electric locomotive

1—Roof-mounted radiator elements
2—Electricity-driven radiator unit fan
3—Main fuel tank
4—Radiator-water drain tank
5—(Radiator compartment) Radiator header tank (Engine compartment) Lubricating-oil heat exchanger
6—Lubricating-oil filter
7—Sulzer LDA 28-C diesel engine
8—Charge-air intercoolers
9—Turbo-charger
10—Body-side air-filter panels
11—Engine air-inlet filter box
12—Combined main, auxiliary and train-heating generator
13—Electrical control cubicle
14—Resistor units
15—Spanner steam train-heating boiler
16—Fuel oil engine-feed tank
17—Batteries
18—Train-heating boiler water tanks
19—Traction-motor blower
20—(Boiler end) Main fuel tank (Radiator end) Brake equipment
21—Air compressor
22—Vacuum brake exhausters
23—Combined pump for lubricating and fuel oil, and cooling circuit
24—Hand brake (operating on bogie beneath it)

However, once the "Lion" prototype was out of the stocks and in trials, its Sulzer 12LDA-28C power unit, and which the 28A variant had already been installed in the "Peak" Class diesels that BR had built at Derby. In some respects the choice of power unit for the new Type 4 was a bit odd, and especially for a lightweight, powerful locomotive, since the

Sulzer engines were almost 3 tons heavier, and nearly double the price of the English Electric V12.

Operationally, the locomotives were intended for high-speed freight, and express passenger duties, and set to work on B.R.'s London Midland, Eastern, and Western Regions. The latter had the distinction of having 17 members of the class carrying names, the only examples from the original series, compared with the numerous namings of Class 47s around in later years. By the 1980s, they could be found almost everywhere, from Lands End to John O' Groats, with some interesting conversions, like the Glasgow to Edinburgh push-pull series.

General Design;

The Brush Type 4, 4,750hp diesel-electric was the first to appear with the 12 cylinder, twin bank Sulzer engine, although five of the 1963 build were equipped with the 'vee' form layout, constructed by the French company CCM. Carried on two, three axle bogies, these new locomotives weighed in at 114 tons, with axle loadings just on the limit of the universally permitted 19 tons, which in its turn determined the need for six axles. Medium speed diesel engines like the Sulzer design were preferred at this time too, when paired with electric transmissions, whilst high speed engines were adopted for those main line locomotives employing hydraulic transmissions.

The Brush design conformed generally to the layout of British diesel locomotives of the day; a full width body, driving cabs at either end, with power equipment and machinery housed within the body, though the treatment of the nose was somewhat different. Previously, for the larger designs of locomotive, triple windscreens, protruding nose, and access doors in the end of the loco's nose were commonly, seen, along with folding headcode indicator discs. In the new Brush design, the BTC Design Panel were put to work, just as had been the case with the Western Region's 2,700hp diesel-hydraulics of the "Western" class. The double windscreen layout of the Brush design, with their four character headcode boxes mounted on the cab's front panel, the new diesel was broadly similar to the Brush "Falcon" prototype locomotive. The latter was fitted with two diesel engines, of course, where the Class47 has only one.

Power Equipment;

The Sulzer LDA28 series engines for the locomotives were built at the Barrow Works of Vickers-Armstrongs (Engineers) Ltd., alongside six and eight cylinder versions of the same engine. At the time, Vickers were actually building one LDA28 engine every day, including engines for the BR built 'Peak' Type 4, Type 3, and Type 2 locomotives, as well as engines for export to other railways around the world. The Sulzer association with railways dates back to 1947, when13 six-cylinder engines were built for installation in locomotives for Irish Railways.

A 12 cylinder Sulzer/Vickers Christmas present for BR in December 1963 – this was the 800th diesel from Vickers, 6LDA, 8LDA and 12LDA all built in this famous works.

© Vickers/RPBradley Collection

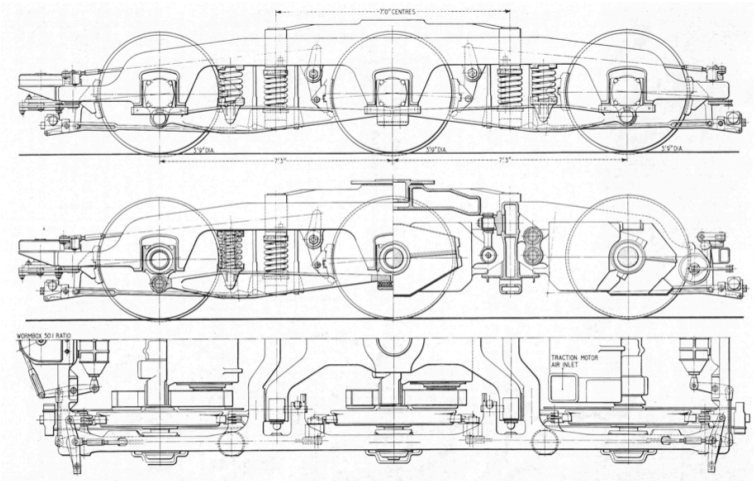
The engines fitted to the new Brush/Hawker-Siddeley locomotives were type LDA28-C, and were four-stroke, pressure charged, intercooled, operating at 800 rpm, and developing 2,750hp. The axle hung main, and auxiliary generators running at 1,150 rpm, with step up gears installed to synchronise the engine and generators. The latter were bolted to the engine bedplate, and a train-heating generator was fitted to a separate sleeve carried on the armature shaft of the main generator. All generators were self ventilated, with the main or traction generator supplying each of six four-pole, force ventilated, axle hung traction motors, each having a

continuous rating of 368 bhp. The final drive was through single reduction spur gears.

The auxiliary and train-heating generators powered various elements of machinery, including the roof mounted radiator fans, traction motor blowers, and exhausters (*For vacuum brake systems*). Within the locomotive body, the 12 cylinder Sulzer engine was positioned in the centre, with the 'free' end facing the Radiator compartment, from which it was separated by a bulkhead. The radiator compartment was located at the No.1 end of the locomotive, whilst the generator end of the engine faced the No.2 end of the loco, with the control cubicle separating the generator and train-heating boiler. In the original design, these boilers were fitted to provide steam heating for trains, and three different types of boiler, from Spanner, Stone Vapor, and Clayton were installed, although many were of course removed when steam heating was discontinued.

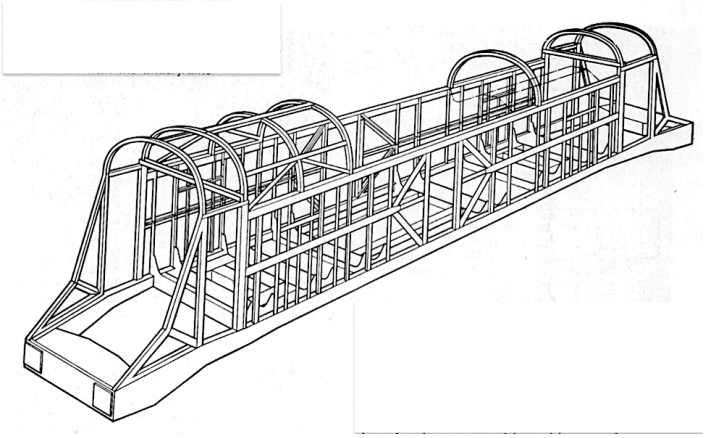
In addition to the "non-standard" 'vee' form LVA24 engines installed in five of the class, the 12LDA28-C engines were down-rated to 2,580bhp, whilst a Ruston Paxman RP12RK3GT engine of 3,300bhp was installed in 47901 as a test bed for the later class 56 and class 58 designs. Little change was seen in the type of traction motor installed - only two designs were used - with the locomotives having these connected in either all parallel, or series-parallel methods, with three stages field weakening.

Bogies, Running Gear, and Construction

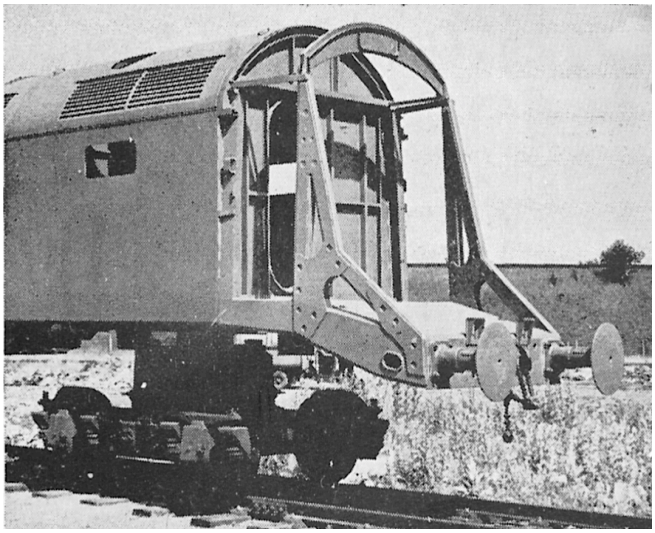


All the Brush Type 4's, or class 47 locomotives, were carried on 'Commonwealth' type cast steel bogies, with 3ft 9ins diameter rolled steel disc wheels. Main suspension is by means of coil springs, with roller bearing axleboxes, and on one inner axlebox on one bogie, a tacho-generator was fitted in standard form, driving the speedometer. Brakes were air operated, with the double piston cylinders mounted on the ends of each bogie, and activated clasp type tread brakes on each wheel through compensated rigging. Mechanical handbrakes were provided, whilst originally at least, it was necessary to install vacuum brake equipment, as B.R.'s passenger trains were then almost all vacuum braked rolling stock.

The all welded integral construction of the body provided the main strength for the locomotive's structure, consisting of bodysides connected by stretchers, deckplates, bulkheads, and roof sections. These latter, where they occurred over the radiator, boiler, and engine compartments, were formed of welded aluminium sections, with translucent fibreglass panels to increase the natural



illumination in these areas. The whole of these roof sections, some of which had opening hatches, were removable from cantrail level, simplifying access still further. Excepting these areas, over the diesel engine itself, all the body



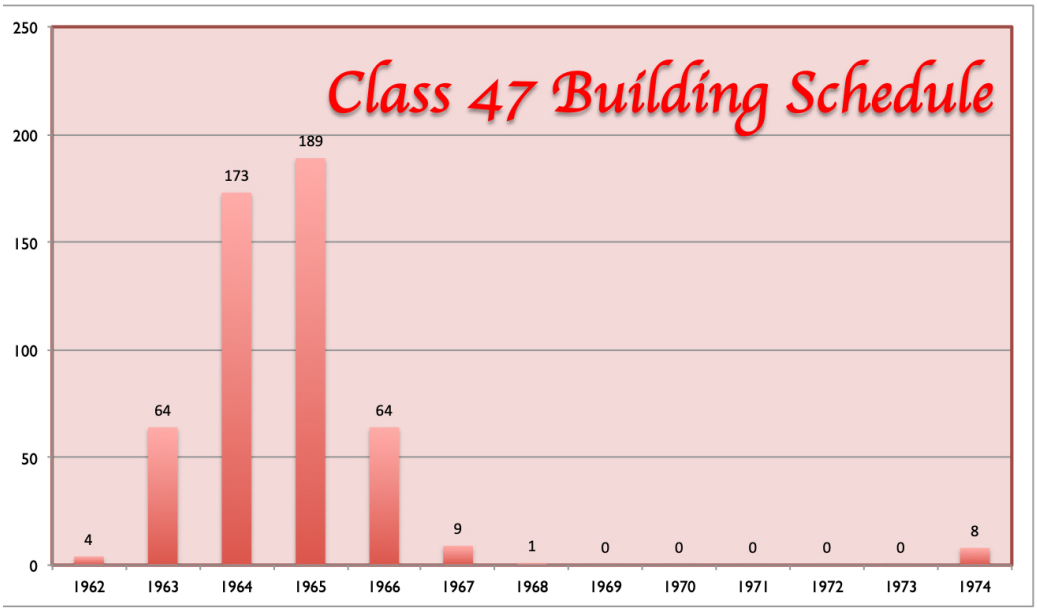
An usual, but interesting view of the framing and trusses before the cab was attached in Loughborough.

structure members and panels were arranged to be load bearing. The deckplating, stiffened by folded steel sections, formed a sump under the engine, drained by pipes, and discharged onto the track.

The driving cabs were designed and constructed almost as a separate unit, built up from aluminium alloy extrusions and panels, with the roof made from fibreglass. Its layout followed closely that of the "Lion" prototype, with a single driving position on the left, and secondman's seat on the right. The cab side roof, and rear bulkheads were all insulated and lined, with a wooden floor, covered in lino. By comparison with some diesel designs of the day, and certainly, the footplates of steam locomotives, the Brush Type 4s accommodation was, to say the least, sumptuous!

Construction & Numbering

The Brush-Sulzer type 4s were originally numbered between DI500-D1999, and D1100 – D1111, and built at Brush's Loughborough Works, and the Crewe Works of BREL, between 1962 and 1967. In total, some 512 were built, with 202 from Crewe Works, and 310 from Brush at Loughborough, although a number of the Brush built 47s were finish painted at Derby Works. In the batch from D1714 to D1840, no fewer than 35 were sent to Derby for painting.



The 'D' prefix was discontinued after the end of steam traction in 1968, and until the introduction of the 'TOPS' renumbering in 1973, the numbers alone were carried on cabsides, or just behind the cab access doors on either side. From 1973, the class was subdivided into three separate groups; 47/1 those locomotives with steam heating

equipment only, 47/2 - locomotives with no heating equipment of any kind, and 47/3 - locomotives with dual, steam and electric heating, and conversions to electric train heating. The TOPS running numbers carried by these diesels were from 47001 - 47529 in 1973/74, though five years later, a number of further sub-divisions had appeared, and the class definitions ranged from 47/0, 47/3, 47/4, 47/6, and 47/7.

The Class 47/6 came about as a result of an accident involving 47046, which was fitted with a Ruston 16RK3CT engine, and used as a testbed for the future Class 56, and renumbered 47601. It was later reclassified 47/9, and fitted with the 12-cylinder Ruston 3,300hp RK series engine used in the Class 58, and renumbered 47901, creating sub-class 47/9. The final sub-division, class 47/7, comprised 12 locomotives modified for high speed push-pull operation for service between Glasgow and Edinburgh, all of which were named.

In the official BR Diagram Book from 1970, there were 12 separate weight diagrams covering the Class 47 variants, although none of them included the 'vee' form engines, but 3 years later, in July 1973, that had increased to 20. Many of these were minor variations, including different models of train heating boilers, and some sporting experimental repairs, such as the addition of weld metal on worn axles to increase the diameter. Although such changes also saw locomotives carrying a small plate fixed to the loco bodyside with the date and experiment, or project reference number.

Operations & Liveries

For a 'maid of all work' the Brush Type 4 did not get off to an ideal start, mainly down to problems with the Sulzer engines. These early problems were rectified, with a return to the Vickers-Armstrongs works at Barrow-in-Furness, for rectification, which was carried out in the mid to late 1960s. The engine trouble reached even the mainstream media, but in 1965, the faults identified as contributing to the problem seemed to lie in an engine mounting bracket, welded to the assembly at the generator end.

However, further investigations revealed that in order to meet the BR requirements, with the uprated Sulzer engine, the lighter crankcase webs appeared to be setting up unwanted vibrations. At the time, in order to overcome the problems, the crankcase webs were made thicker under the repair process, and Sulzer was required to provide a 10-year guarantee against structural failure on future engines.

But, the works continued to build 8 and 12 cylinder engines for BR, and as we know, the Class 47 has remained one of the longest surviving diesel types that BR had in its stock.

In 1964 most of the Class were allocated to 41A (Tinsley), 34G (Finsbury Park), 52A (Gateshead), 86A (Cardiff Canton), 87E (Landore), with some at 16A (Toton) and 2B (Oxley/Wolverhampton). They were of course still being delivered, and allocations would change.

By the end of the decade – from October 1968 – the new TOPS renumbering referred to earlier was the official means of identification, and gradually, the 'D' prefix was seen to disappear from many locomotives, and just the 4 numerals carried on cab side panels. By 1973, the TOPS numbers had been allocated, according to the official tables – an extract of which is shown below:

1973 TOPS Renumbering Allocations

Class	New TOPS No.	Original Number	Train Heating
47/1	47001 - 47298	D1521-4/6/8-30/2/7-40/3/4/6/70 /2/3/83-5/8/91/2/7/9/1605/6/9-11/3-5/7-26/8-35/8-61/3-70/2-82/4-8/90-1706/8-12/4/5/7-24/6-33/5-52/4-9/61-81/1837-74/1901-7/9-31/3-5/8/50/6/7/62-7/ 9-74/6-99/1100	Fitted with steam heating equipment only.
47/2	47301 - 47381	D1782-1836/75-1900	No heating equipment at all.
47/3	47401 - 47529	D1500-20/5/7/9/31/3-6/41/2/5/7-50/2-61/3-9/71/4-82/6/7/9/90/3-6/8/1600-4 /7/8/12/6/27/36/7/62/83/9/1707 /13/6/25/53/60/1932/6/7/9-49/51-5/8-61/8/75/1101-10/1551	Dual steam/electric heating equipment, including locomotives converted to ETH only.

From this, the variations according to train heating boiler and type are shown, which along with various other modifications led to the creation of a number of sub-classes.

This had changed a little towards the end of the decade, but the regional variations were still largely the same – aside from the increased number sent to Scotland, which included those modified for push-pull working on the high-speed Edinburgh to Glasgow services. This was completed by the early 1980s, and the 12 Class 47s fitted for 100mph working were based at Edinburgh Haymarket and Glasgow Eastfield depots. The service was extended to operate between Glasgow and Aberdeen, with another 4 locomotives converted, and reclassified 47/7, and numbered 47701 to 47716.

As these locomotives were deployed over all regions, they worked many classes of passenger and freight train, including the Freightliner services and other special air-braked freight trains, and the "merry-go-round" coal trains. For these, some of the class were fitted with a special slow speed control for use when loading and unloading at collieries and power stations.

In 1974, a sample from the depot allocations shows just how widely they were spread across the network:

Eastern	Western	London Midland	Scottish
168	143	136	3
37%	*32%*	*30%*	*1%*

1978 - Examples Class 47 Allocations

Depot Code	Name	Number Allocated	Region
FP	Finsbury Park	14	Eastern
IM	Immingham	24	
SF	Stratford	34	
TI	Tinsley	18	
YK	York	25	
BS	Bescot	45	London Midland
CD	Crewe Diesel	85	
TO	Toton	25	
HA	Haymarket	16	Scottish
ED	Glasgow Eastfield	14	
BR	Bristol	20	Western
CF	Cardiff	66	
LA	Laira	16	
LE	Landore	18	

Originally, all Brush type 4s were painted in a two tone green livery, with underframe and bogie details in black, the green livery area extended over the roof, with the lighter green band - 'Sherwood Green', extending from just below the cab window, to 1ft 3ins above the bottom edge of the body. A half-height yellow warning panel was provided on the cab front panel, later replaced by a full yellow end, as rail blue livery came to be applied as standard from 1967 onwards. In fact, the first example of the then new B.R. rail blue livery put in its appearance on a class 47 in 1964, along with new coach designs, including XP64 stock. The locomotive in question was one D1733, and with its essentially all over blue livery, the then proposed new B.R. double arrow symbol appeared on a red panel below the cabside windows.

In the late 1970s and early 1980s, standard Rail Blue was the order of the day. Here, 47443 looking a bit careworn in the Parcels Bay at Barrow-in-Furness. Originally D1559, this loco was built at Crewe in March 1964. © *RPBradley Collection*

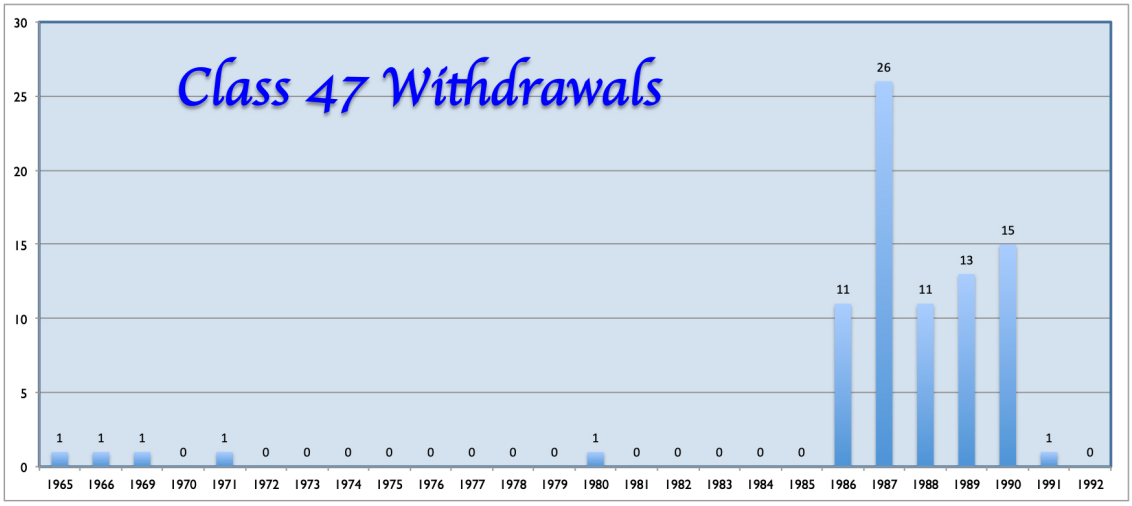
In original Rail Blue repaints, the blue was applied all over the body and roof, with dark brown underframe and bogies. The full height yellow ends, included an extension to the yellow painted area around the cab side windows as well as the windscreen. Some interesting variations appeared just as the number of withdrawals increased, with grey roofs, black highlighting around the cab windows, and enormous double arrow symbols painted on the bodysides, just behind the cab door.

Whilst it would probably be true to say that until the late 1980s, building a model of a class 47 was straightforward, especially where livery is concerned, this changed significantly in the 1980s. British Rail introduced sector management in 1982, with responsibility for passenger services divided between three sectors – Intercity, London & South East (later, Network Southeast), and Provincial. The latter are responsible for all secondary services on the B.R. network with the new Network Southeast also responsible for secondary and commuter workings in and around the capital, on each region. Freight and parcels traffic was also "sectorised", where many Class 47s operated, and included initially as the single "Railfreight" sector, but later with a number of sub-divisions.

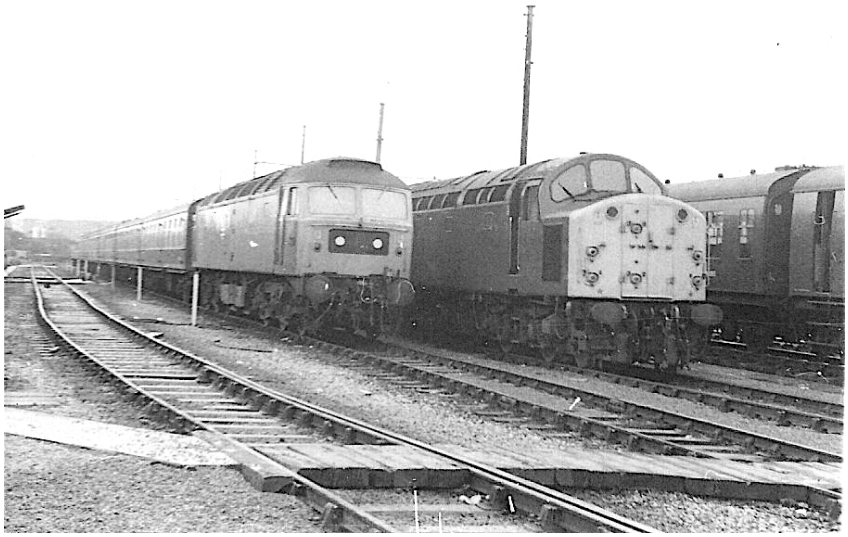
Classic 1970s shot of a pair of 47s on a typical MGR working at Nunhead, the lead loco is 47352, with an unidentified partner in support. The standard "Rail Blue" in this form was common for many years. *Photo: Dave Larkin*

Amongst the many changes that took place, the small number of specially painted examples, such as the 'Great Western' repaints, were joined by many others, including 47522 for the Parcels Sector in LNER green, Railfreight Sector introduced that extended the application of the grey paint schemes. More examples followed in Network Southeast colours. InterCity livery has been applied to a number of locomotives, with larger numerals, double arrow logo, and increasing numbers of

names being carried ensured a considerable variety.



The class 47 had seen only 5 members of the class – due to accidents – after more than 20 years of service, but by 1986, withdrawals were begun in earnest, and as you can see from the chart, by the early 1990s, 82 of the original Brush/Hawker-Siddeley Type 4 had been withdrawn. The first officially recorded withdrawal of a Class 47 whilst still in working order was on 26th January 1987 - the unlucky locomotive being 47429.



The 1st and 2nd generation main line diesels alongside one another on the 15th March 1981, with Class 40 No. 40012 and Class 47 No. 47473 at Barrow F&I Point. © *RPB Collection*

In the 1980s, the class were being 'eased out' of some duties, and replaced by the newer Class 56 and Class 58 types, whilst the arrival of BR's last main line diesel - the class 60 - did spell the end of the line for the entire class. But rail privatisation from 1992 onwards actually brought the Brush design a lifeline – albeit a small one. The new train operating companies – competing with one another for passenger, and some freight traffic – needed motive power to begin operations, before they could order new locomotives. The answer was of course the Class 47, which saw a number survive alongside the newer Class 56, 60, and even 66/67 types. In Britain, the class was effectively the last survivor of the Sulzer legacy, and many are still in operational use today, as charter and tour operators' motive power, alongside specialist train operating companies.

Of course some have been 'rescued' and used on heritage railways. The Brush-Sulzer design, despite its early teething troubles, notably in respect of its engine design, has been British Rail's most successful maid of all work.

Leading Dimensions of Original Locomotives

Wheel arrangement:	Co-Co
Weight in working order:	114 tons
Tractive effort – Maximum:	55, 000 lbs @ 12.7 m.p.h.
Continuous:	30,000 lbs@ 27m.p.h.
Wheelbase:	51ft 6ins
Bogie wheelbase:	14ft 6ins
Bogie pivot centre:	37ft 0ins
Wheel diameter:	3ft 9ins
Width overall:	8ft 9 ¾ ins
Length overall:	63ft 6ins
Height overall:	12ft 9 3/8 ins
Minimum curve radius:	4 chains
Maximum speed:	95 mph
Main fuel tank:	850 gallons
Engine lubricating oil tank:	190 gallons
Cooling water tank:	300 gallons
Radiator capacity:	62 gallons
Boiler water tank capacity:	1,250 gallons
Braking Systems:	
Locomotive:	Westinghouse compressed air and hand brakes
Train:	Vacuum brake equipment is fitted giving proportional air brake application on the locomotive
Diesel engine:	
Make & Type:	12 cylinder Sulzer diesel engine, type 12 LDA/28C of double-bank in-line pressure-charged and intercooled 4-stroke rated at 2,750 h.p. at 800 r.p.m.
Cylinder bore x stroke:	280mm x 360mm
Electrical equipment:	
Main generator:	Brush D.C. type Continuous rating - 2,130 amps at 844 volts = 1,798KW at 1,150 r.p.m.
Auxiliary generator:	Brush D.C. type. Continuous rating 240 amps at 110 volts = 26.4 kW at 1,150r.p.m.
Traction motor (6):	Brush D.C. Force-ventilated type. Continuous rating - 368 h.p. at 422 volts, 710 amps at 776 r.p.m.
Traction motor gear ratio:	0.754166667
Train heating generator (where fitted)**:**	Brush D.C. type, self ventilated. Continuous rating – 400 amps at 800 volts = 320 kW at 690/1,150r.p.m.
Auxiliary equipment:	
Traction motor blowers (2)	Motor driven
Batteries:	Lead acid, 48 cell, 169A.H. at 5 hour rate
Control circuit voltage:	110
Radiator fans (2):	Motor driven
Air compressor:	Motor driven
Vacuum exhausters (2):	Motor driven
Train heating boiler:	Spanner Mark 3

Variations on a theme:

The Class 57

Whilst the Class 47 had been gradually withdrawn – mainly in the 1980s – the advent of privatisation in 1991 brought a new dimension to rail freight operations in Britain. The fragmentation of passenger services from the old British Rail sectors was the most visible, but the impact on freight services was no less far reaching. Initially, one element remained as a single entity – Freightliner – whilst the other freight sectors were absorbed into the English, Welsh & Scottish (EWS) railway. Freightliner was borne from the old liner train concept envisaged back in the 1960s by Dr Beeching.

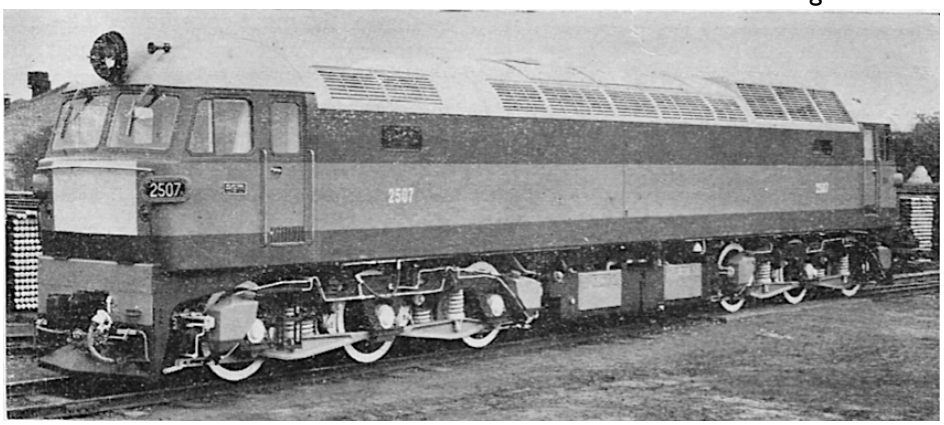
In the mid to late 1990s, rail freight operations in the UK were essentially in the hands of the imported 2-stroke diesel powered designs, with EMD engines. So, in the late 1990s, following a requirement from Freightliner in 1997 a number of existing Class 47s were picked out to be re-engineered to carry an EMD 645–F3 12-cylinder diesel engine. Both the engine and alternator sets were re-conditioned and refurbished, and 33 of the number were rebuilt.

The locomotives were leased from the Rolling Stock Operating Company Porterbrook, and although Freightliner were the driving force behind the new locomotives, and had plans for a fleet of more than 20, it was not continued, and they acquired new Class 66 types instead.

However, other member so the new private Train Operators bought into the Class 57, from Direct Rail Services to Virgin Trains. The Class 57 remains in service – on hire – to a number of the independent operators.

Cuba

In 1962, Sulzer had built its 12LVA24 locomotive diesel engine, directly coupled to a d.c. generator for French National Railways (SNCF). In addition to its success in France, and the five experimental Class 47 examples for BR, late in 1963 the Cuban National Railways placed an order for ten main-line diesel-electric locomotives with the Clayton Equipment Co. Ltd. This followed on the back of an investigation into modern designs that could be adapted to suit Cuban needs, which suggested a Type 4 diesel-electric would be the most suitable. Clayton Equipment then obtained licence to manufacture a design conforming to the then standard 2,750 b.h.p. Class 47, with its Co-Co wheel arrangement. However, at this point, and given the French success, the Cuban design was fitted with the Sulzer 12-cylinder LVA24 Vee-engine rated at 2,500 b.h.p., which were manufactured in France.



The 7th of the order for Class 47 lookalike locos for Cuba, but this time fitted with the Sulzer 12LVA24 engine, built in France, transported to Loughborough, and then shipped out to Cuba at a flash point in the growing 'Cold War'.

In outward appearance, it was strikingly similar to the Brush design for BR, but with a number of detail variations including the centre coupler and headlight over the cab windscreen, and of course no BR style train headcode boxes. These locos were fitted with air-brake equipment only, with no need for vacuum brake systems in parallel, whilst the body was built in the same way as the BR version, an all welded, integral structure.

At the time of their construction, the Cuban Missile Crisis had only recently taken place, and the involvement of Hawker Siddeley/Brush in the building of these locos, who also had considerable interest in the UK defence industry, would have raised not a few eyebrows. So, although the order was placed with Clayton Equipment, the construction was, for the most part carried out by Brush at the Falcon Works. As one source has referred to this event, some subterfuge was the order of the day:

> *"To put the record straight: the bodyshells and most of the components for the Cuban locomotives were manufactured at the Falcon Works, although it appears that works numbers were not assigned. Some of the heavy assembly work was also done by Brush but final assembly and painting was performed by International Combustion Ltd., a company based in Derby. The semi-complete machines were moved there on makeshift bogies adapted from wooden bodied wagons. The 10 completed locomotives were tested on the Derby-Bristol line, usually under cover of darkness, and always light-engine as the buck-eye coupler prevented the connection of coaching stock. Nos.2501 and 2502 were shipped to Cuba from Hull docks on July 30th 1965 aboard the Yugoslavian freighter 'Kolasin'; an event which, despite all of the secrecy, was reported on the front page of the Hull Daily Mail!"*

An intriguing side order in the story of the Brush Type 4.

The Survivors

There are today 51 Class 47s available for use on main line operations, and perhaps as long as there are spare parts and the opportunities to restore, operate and maintain, the 1962 designs from Brush Traction Ltd will be with us a bit longer yet. The majority of these – 22 – are operated by West Coast Railways from their Carnforth base, although a number of these are 'stored'.

There are also 32 in varying states of preservation, a fair number in working order, including 47798, 47270, 47580 and 47773, which are maintained to main line standards. 47798 is used for the "Royal Train", and like the others, does operate on the main rail network from time to time. They are located across the country, owned by various Class 47 groups, and 9 are privately owned, whilst D1656, or 47798 is part of the National Collection at the NRM, named "Prince William", and as mentioned, is used for the "Royal Train".

The liveries for these survivors does vary, with West Coast Railways examples in maroon, as is the preserved "Royal Train" locomotive, with no fewer than 11 of the preserved examples in what was once described as that boring Rail Blue livery. But in the end, whether they are in the original BR two-tone green, Rail Blue, or maroon, they are still with us, and look set to be roaming the rails for some years to come yet.

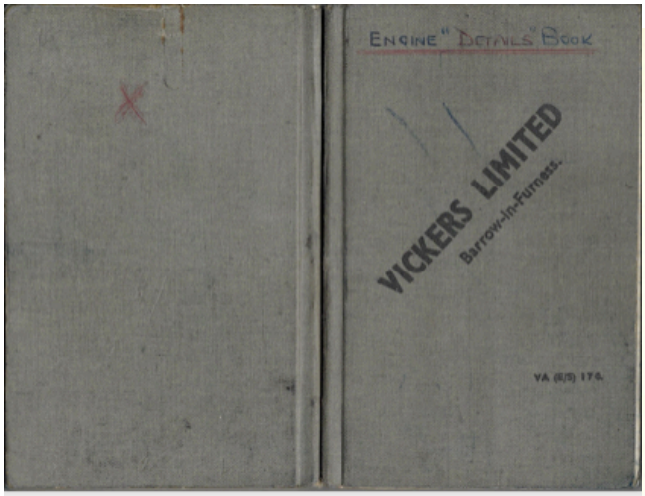
Parting Shots

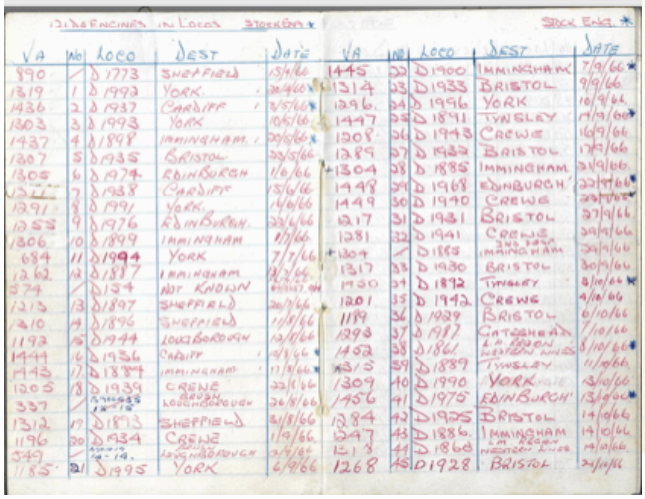
47826 in InterCity livery, but playing tail end Charlie to the restored BR Standard Class 8P "Duke of Gloucester", which has just entered the tunnel at the west end of Dalton-in-Furness station in March 2007.

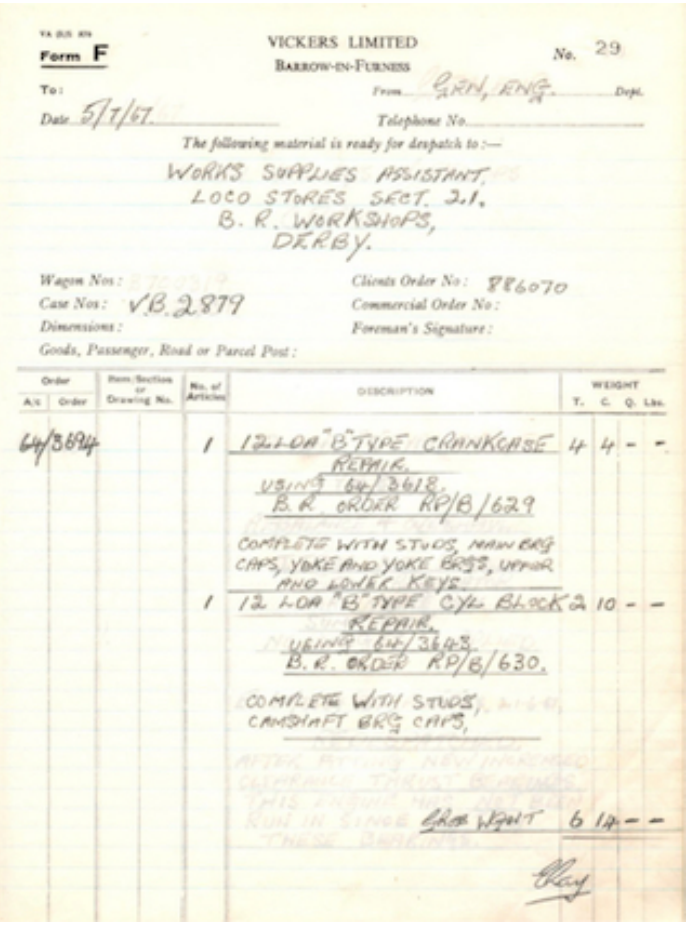
© RPBradley Collection

Brush Type 4 (later Class "47/0") 2,750hp Co-Co No.D1865 (later No.47 215) in BR two-tone green livery at Stratford MPD, 07/67. Note odd headcode. Because of fatigue problems with their Sulzer engine frames, D1865 was one of a batch (D1862-D1961) to be downrated in 1966-67 from 2,750hp to 2,340hp after trails with similarly downrated D1930 & D1932 had been successful, but at the cost of a serious impact on train schedules. Subsequently, engine modifications and a downrating to 2,580hp for all Class 47's proved to be a satisfactory compromise, although the sparkling performance of the class in original form was never recaptured. From being great fans of the complex, Swiss-designed Sulzer engines, BR management was seemingly irrevocably put-off and the less high-tech, but more robust and reliable English Electric engines regained favour.

Photo: Hugh Llewelyn







A couple of examples of the re-work done by Vickers following the faults found with the earlier Sulzer engines for the class, with much of the work carried out in a separate section of the works.

Class 47 No. 47434 in the morning sun, with the 08:22 for Preston from Barrow-in-Furness. © *RPBradley Collection*

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